

# The “Modern” Civil War: Advances in Military and Naval Technology

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When you visit the CSS *Neuse* State Historic Site in Kinston, the remains of the Confederate ironclad there may seem like an ancient relic of a bygone era. But when the ship was built, it stood on the cutting edge of technology. In the 1860s, no airplanes, tanks, or radios existed. But historians often consider the Civil War the first “modern” war due to advances such as ironclad ships. New technologies made the armies and navies much more efficient. Such increased efficiency, however, translated into higher casualty rates and even more destruction and devastation. This article will examine four crucial advances: the transition from smoothbore weapons to rifled weapons; the switch from sailing ships to steam-powered ships; the development of ironclad war-ships and submarines; and the use of torpedoes and land mines.

## Rifled Weapons

First, one of the most significant advances in weaponry was the change from smooth-bore weapons to rifled weapons. Rifling consisted of spiral grooves cut into the weapon’s barrel. The projectile engaged those grooves when the weapon was fired, making the projectile spin as it flew through the air. Rather than firing a round ball (like those used in the Revolutionary War), rifled weapons fired a conical bullet. These conical bullets proved much more accurate and could hit targets at a greater distance. For instance, a smoothbore musket was accurate to about 80 yards, but a rifled musket was accurate to 300 yards or more. Battlefield tactics did not change with this increase in accuracy, however. Most Civil War officers still told their men to hold their fire until the enemy was within 100 yards—making the rifled musket a much deadlier weapon.

Rifles had existed for well over a century before the Civil War, but people mainly used them for hunting rather than as military weapons. In previous wars, riflemen were utilized as sharpshooters. The United States Army had standardized the use of rifled muskets in 1855. The Confederate army used a variety of weapons, but rifled muskets became the weapons of choice for its army as well.

Armies first used rifled cannons, or artillery pieces, in the Civil War. With their increased range and accuracy, rifled cannons made an entire generation of forts obsolete. Brick and masonry forts such as Fort Macon, constructed between 1826 and 1834, had been built to withstand bombardment by smoothbore cannons. Rifled cannons firing larger, heavier projectiles with greatly increased accuracy could breach such fortifications rather easily. To counteract rifled cannons, forts built during the Civil War were earthen forts constructed of dirt, such as Fort Fisher and Fort Anderson. Earthen forts could absorb incoming artillery shells and better protect the men and material inside.

## Steam-Powered Ships

A second big Civil War–era innovation in technology was the switch from sailing ships to steam-powered ships. Boilers fired by coal produced the steam pressure needed for these ships' engines to turn the paddle wheels or propellers that made the vessels move through the water.

Even though the first steam-powered ship in the United States had been launched in 1807, the U.S. Navy in 1860 remained largely a sailing fleet. The adoption of steam power aided both the Union and Confederate navies, but it also presented new challenges. Steamships usually moved faster than sailing vessels (a quality that the Confederates used to their advantage in the blockade-running trade), but steamers could carry a limited amount of coal. Crews needed fueling stations and a good supply of high-quality coal. Also, steam engines required some sailors to develop new skills, in order to deal with mechanical issues and breakdowns, much like their predecessors had to learn to make and repair sails.

Steamships proved superior to sailing ships in sea-to-land engagements. Because of wind and current, sailing vessels often had to anchor in front of their target on land to take aim. In turn, the ships became stationary targets at which heavy seacoast guns easily could fire. Steam power gave warships the ability to fire while moving. A moving target is more difficult to hit. This mobility, combined with the development of rifled guns, gave naval forces a distinct advantage in sea-to-land engagements. This advantage became apparent in August 1861. The Union navy successfully bombarded and forced the surrenders of Fort Clark and Fort Hatteras on the Outer Banks, gaining control of Hatteras Inlet early in the war.

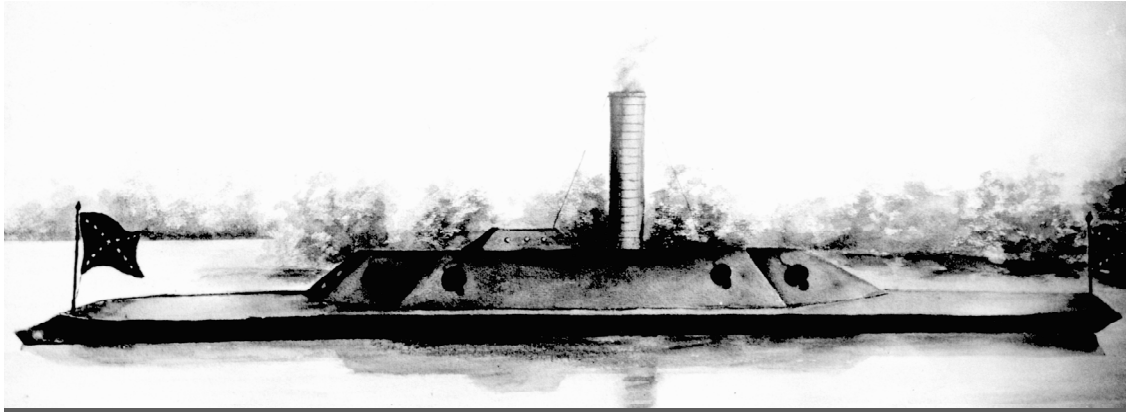
## Ironclad Warships and Submarines

Along with steam power, another advance in naval technology was the development of ironclad warships and submarines. Both France and England had created iron-plated warships in the 1850s, and many American naval officers took notice. Both the Union and Confederate navies designed and built ironclads during the Civil War. Almost all ironclads were steam powered. Most were designed to ride low in the water, making them harder to hit. Builders made ironclads partially of wood, which they then covered with iron plating. These vessels represent the transition from wooden, sail-powered ships to completely metal, steam-powered ships.

The most famous of all the ironclads was the USS *Monitor*, built in New York and commissioned in February 1862. It sank in a storm off the North Carolina coast near Hatteras in December 1862. The *Monitor* featured a unique revolving turret, a small armored tower at the top of the ship that turned and protected guns mounted inside it. Throughout the war, the navies built many variations of this vessel. Some even had two turrets. Another type of ironclad, the casemate ironclad, utilized fixed, angled walls instead of the revolving turret. This design was simpler and cheaper to build. The Confederate navy built only casemate ironclads, which also could carry more cannons. Ironclads stood up to almost every test they faced in the Civil War, with the exception of torpedoes, or underwater mines, which will be discussed later.

Four ironclads were completed in North Carolina during the war: the CSS *Albemarle* at Edwards Ferry on the Roanoke River; the CSS *Neuse* at Kinston on the Neuse River; and the CSS *Raleigh* and CSS *North Carolina* at Wilmington on the Cape Fear River. All were destroyed in the war or

shortly thereafter. Only the CSS *Albemarle* sank in a combat action; crews of the other three wrecked or sank them to avoid capture.



Work on the CSS *Albemarle* began in a cornfield along the Roanoke River at Edwards Ferry in January 1863. Completed at Halifax, the ironclad played an important role during the Confederate recapture of Plymouth in April 1864, ramming and sinking the USS *Southfield* and driving away the USS *Miami*. Lieutenant William B. Cushing of the U.S. Navy sank the *Albemarle* with a torpedo in October 1864. Plymouth soon fell to the Federals again. *Image courtesy of the Alfred Barden Collection, State Archives, North Carolina Office of Archives and History.*

The first vessels that we would recognize as submarines were developed during the Civil War. The USS *Alligator* and the Confederate *H. L. Hunley* represent the best-known examples. Like the *Monitor*, the *Alligator* sank off the North Carolina coast in a storm in April 1863. The *Hunley* successfully sank a Union warship, the USS *Housatonic*, in Charleston (South Carolina) Harbor before being lost beneath the waves in February 1864. One of the eight crew members who died on the *Hunley* was North Carolina native James A. Wicks.

### **Torpedoes and Land Mines**

Finally, the Civil War saw the first widespread use of torpedoes (underwater mines) and land mines. Many different torpedo designs were utilized, mainly by the Confederacy. No matter the design, these weapons worked the same way. They were placed in the water just below the surface. When an unsuspecting ship ran into a torpedo, it detonated, blowing a hole in the ship's hull and causing it to sink. This was the major weakness of the ironclads; most only had iron plating on the part of the ship above the water. The hull, below the water, had no protection from torpedoes.

Some torpedoes were electrically detonated with a battery or a hand-cranked generator. Others had a fixed fuse that fired upon contact with a ship. The same detonating methods were used with land mines. North Carolina native General Gabriel Raines, a West Point graduate from Craven County, developed one of the most widely used torpedo fuses of the Confederacy, among his other contributions to advancing military technology. Torpedoes utilizing the Raines fuse were responsible for sinking numerous Union vessels. The Confederates used torpedoes and land mines at various locations in the Tar Heel State, such as Fort Fisher, and in many rivers, including the Cape Fear and the Roanoke.

All of these technological advances played an important role in the conduct of the Civil War. Each one impacted the war in North Carolina. In some cases, North Carolinians took an active

role in using the technology, and in other instances the technology worked against them. These developments forever changed warfare, making the Civil War a time of great transition and change in military technology.

*\*At the time of this article's publication, Andrew Duppstadt served as assistant curator of education and historic weapons program coordinator for the Division of State Historic Sites and Properties. He had been working for the division since 2001, including the previous four years in that position. Duppstadt earned a BA and an MA in history from the University of North Carolina at Wilmington.*